

REMARKS

The Office Action mailed on January 8, 2003, has been received and reviewed. Claims 1-32 are currently pending in the above-referenced application. Each of claims 1-32 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Information Disclosure Statement

Please note that a Supplemental Information Disclosure Statement was filed in the above-referenced application on or about January 15, 2003, after the date of the present office action. It is respectfully requested that the references listed on the Form PTO/SB/08 that accompanied that Supplemental Information Disclosure Statement be considered and made of record in the above-referenced application, and that an initialed copy of the PTO/SB/08 evidencing the same be returned to the undersigned attorney.

Objection to the Drawings

The drawings were objected to under 37 C.F.R. § 1.84(p)(5) for including reference numerals that are not mentioned in the description.

Proposed corrections to FIGs. 1, 20, and 21 are submitted herewith, under cover of a separate Letter to the Official Draftsperson, to address the objections by removing the reference numerals that do not have support in the specification, as well as their corresponding lead lines. All proposed corrections have been marked in red.

Approval of these corrections and withdrawal of the objections to the drawings are respectfully requested.

Objection to Specification

The title of the above-referenced application has been objected to as being not descriptive of the invention recited in the claims.

The title has been amended herein to more accurately describe the subject matter recited in the claims. Accordingly, withdrawal of the objection to the specification is respectfully requested.

Objections to Claims

Claims 8 and 19 have been objected to because of the misspelling of the word “plane.”

The intended word was “plan,” not “plane.” In any event, both claim 8 and claim 19 have been amended to replace the term “plan” with “shape,” which more accurately identifies the intended subject matter of these claims.

Withdrawal of the objections to claims 8 and 19 is respectfully requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 2 and 27 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

In particular, the phrase “contact pads will extend beyond said active surface” was rejected. It is respectfully submitted that when claims 2 and 27 are read in their entireties, it is clear that the phrase “will extend beyond said active surface” modifies “at least one conductive structure,” not “contact pads.” Thus, it is clear that claims 2 and 27 both recite “at least one conductive structure . . . will extend beyond said active surface.”

As the subject matter recited in claims 2 and 27 is already clear, it is respectfully submitted that each of these claims complies with the requirements of the second paragraph of section 112 and requested that the rejection thereof be withdrawn.

Rejections Under 35 U.S.C. § 102(b)

Claims 1-3, 5, 7-11, 25-28, 31, and 32 stand rejected under 35 U.S.C. § 102(b).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference that qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053

(Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Kuniaki

Claims 1-3, 7, 8, 10, 11, 25 through 28, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese publication JP 10-189653 of Kuniaki et al. (hereinafter “Kuniaki”).

Kuniaki describes a semiconductor element 3 that is configured for flip-chip mounting to a carrier 2, such as a circuit board. Among other things, the semiconductor element 3 of Kuniaki includes a plurality of bond pads, which are referred to as “electrodes 7,” that are arranged centrally in-line on an active surface 4a of the semiconductor element 3. Each electrode 7 is configured to receive a solder ball 11 to facilitate electrical connection of that electrode 7 to a corresponding terminal 14 of the carrier 2. In addition, the semiconductor element 3 includes at least one support projection element 12, which is configured to come into contact with the carrier 2 as the semiconductor element 3 is positioned thereover. Each support projection element 12 includes two pieces: a first comprising an auxiliary electrode 10a-10d; and a second comprising a solder ball 12.

Independent claim 1, as amended and presented herein, recites a semiconductor device component that includes a substrate having an active surface with contact pads exposed thereto and at least one stabilizer protruding from the active surface. The at least one stabilizer is “positioned between a periphery of [the] active surface and each contact pad exposed to [the] active surface.”

As the disclosure of Kuniaki is limited to support projections 12 which include auxiliary electrodes 10a-10d, Kuniaki cannot expressly or inherently describe that any of the support projections of the semiconductor element 3 thereof is “positioned *between* a periphery of [an] active surface and each contact pad exposed to [the] active surface” thereof.

Accordingly, it is respectfully submitted that Kuniaki does not anticipate each and every element of amended independent claim 1, as is required to maintain a rejection under 35 U.S.C. § 102(b). It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), amended independent claim 1 is allowable over Kuniaki.

Claims 2, 3, 7, 8, 10, and 11 are each allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Independent claim 25, as amended and presented herein, recites a semiconductor device component that includes a substrate and at least one stabilizer protruding from an active surface of the substrate. The substrate includes contact pads exposed to the active surface thereof. The at least one stabilizer, which is nonconductive, is positioned between the contact pads and an outer periphery of the active surface.

In contrast, Kuniaki lacks any express or inherent description that any of the support projections 12 thereof is nonconductive. Kuniaki also lacks any express or inherent description that any of the support projections 12 thereof is positioned between an electrode 7, 10a-10d and an outer periphery of the active surface 4a thereof.

It is, therefore, respectfully submitted that Kuniaki does not anticipate each and every element of amended independent claim 25. Therefore, it is respectfully submitted that, under 35 U.S.C. § 102(b), amended independent claim 25 is allowable.

Each of claims 26-28 is allowable, among other reasons, as depending either directly or indirectly from claim 25, which is allowable.

Claim 26 is additionally allowable because Kuniaki lacks any express or inherent description that any of the support projections 12 thereof are “configured so that voids do not occur in [an] insulative underfill material when [the] insulative underfill material is flowed into [a] space created when [the] substrate is connected with . . . another semiconductor device.”

Independent claim 32, as amended and presented herein, also recites a semiconductor device component that includes a substrate and at least one stabilizer protruding from an active surface of the substrate. The at least one stabilizer of independent claim 32 is “positioned between a periphery of [the] active surface and . . . contact pads” that are exposed to the active surface.

Again, the support projections 12 that are described in Kuniaki include solder bumps 11 on auxiliary electrodes 10a-10d. Therefore, the support projections 12 cannot be positioned

between the auxiliary electrodes 10a-10d and an outer periphery of the active surface 4a of the semiconductor element 3 that is described in Kuniaki.

It is, therefore, respectfully submitted that Kuniaki does not anticipate each and every element of independent claim 32 and that, under 35 U.S.C. § 102(b), independent claim 32 is, therefore, allowable over Kuniaki.

Watanabe

Claims 1, 3-5, 7-11, 31, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese publication JP 58-157146 of Watanabe (hereinafter “Watanabe”).

The semiconductor chip 1 of Watanabe includes an area array of bond pads 2 on an active surface thereof, as well as spacers 6 of photosensitive resin positioned adjacent corners of the active surface.

Each of amended independent claims 1, 31, and 32 recites a semiconductor device component that includes a substrate and at least one stabilizer protruding from an active surface of the substrate. The substrate includes contact pads. All of the contact pads of the substrate are arranged in-line with other contact pads thereof and are positioned proximate to a center line of the substrate.

As the semiconductor chip 1 of Watanabe includes bond pads 2 that are not positioned proximate to a center line thereof, it is respectfully submitted that Watanabe does not expressly or inherently describe each and every element of any of amended independent claims 1, 31, or 32. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), each of amended independent claims 1, 31, and 32 is allowable over Watanabe.

Each of claims 3-5 and 7-11 is allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

In view of the foregoing, it is respectfully submitted that the 35 U.S.C. § 102(b) rejections of claims 1-3, 5, 7-11, 25-28, 31, and 32 should be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 6, 12-24, 29, and 30 have been rejected under 35 U.S.C. § 103(a).

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Watanabe, in View of Blanton

Claims 6, 13-22, and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe, in view of U.S. Patent 5,220,200 to Blanton (hereinafter "Blanton").

Claim 6 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Blanton describes carrier substrates 30, in the form of ceramic circuit boards, that have pillars 50 formed thereon. Each pillar 50 includes a plurality of layers 40a, 40b, 40c, etc., each of which is also referred to as a "layer 40" for the sake of simplicity. Layers 40 are formed from different materials. *See, e.g.*, col. 6, line 53, to col. 7, line 35. Some of layers 40 are formed from electrically conductive materials, while other layers 40 are formed from dielectric materials. *See id.* Pillars 50 are formed on a substrate 30 at the same time and from the same materials as circuitry is formed on the substrate 30. Col. 4, lines 55-58; col. 8, lines 9-24.

Independent claim 13, as amended and presented herein, recites a semiconductor device component that includes a substrate and at least one stabilizer protruding from an active surface of the substrate. The at least one stabilizer includes a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises dielectric material.

Both Watanabe and Blanton lack any teaching or suggestion of a semiconductor device component which includes at least one stabilizer that includes a plurality of superimposed,

contiguous, mutually adhered layers, each of which comprises dielectric material. It is, therefore, respectfully submitted that, under 35 U.S.C. § 103(a), amended independent claim 13 is allowable over Watanabe and Blanton, taken either separately or in combination.

Each of claims 14-22 and 24 is allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Claim 20 is further allowable since neither Watanabe nor Blanton teaches or suggests a semiconductor device component which includes at least one stabilizer which is “elongated in a direction parallel to [an] active surface” of a substrate thereof. Rather, all of the spacers 6 of Watanabe are circular, while all of the pillars 50 of Blanton have square cross-sections.

Kuniaki, in View of Blanton

Claims 29 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kuniaki, in view of Blanton.

Claims 29 and 30 are both allowable, among other reasons, as depending from claim 25, which is allowable.

Kuniaki in View of Sato

Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kuniaki, in view of U.S. Patent 6,287,895 to Sato (hereinafter “Sato”).

Claim 12 is allowable, among other reasons, as depending from claim 1, which is allowable.

Watanabe, Blanton, and Sato

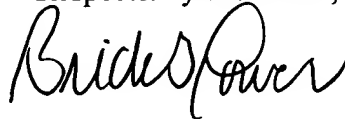
Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe, in view of Blanton and, further, in view of Sato.

Claim 23 is allowable, among other reasons, as depending from claim 13, which is allowable.

CONCLUSION

It is respectfully submitted that each of claims 1-32 is allowable. An early notice of the allowability of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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Date: April 8, 2003

Enclosure: Version With Markings to Show Changes Made

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

Please amend the title as follows:

[STEREOLITHOGRAPHIC METHOD AND APPARATUS FOR FABRICATING]
STABILIZERS FOR FLIP-CHIP TYPE SEMICONDUCTOR DEVICES AND [RESULTING
STRUCTURES] SEMICONDUCTOR DEVICE COMPONENTS AND ASSEMBLIES
INCLUDING THE SAME

IN THE CLAIMS:

Please amend the claims as follows:

1. (Amended) A semiconductor device component, comprising:
a substrate having an active surface with contact pads exposed thereto, said contact pads being configured to be connected with conductors on a first surface of another semiconductor device, each contact pad of said substrate being substantially in-line with at least one other contact pad and positioned proximate to a center line of said substrate; and
at least one stabilizer protruding from said active surface and positioned between a periphery of said active surface and [said] each contact pad[s] exposed to said active surface.
8. (Amended) The semiconductor device component of claim 1, wherein said at least one stabilizer has a cross-sectional [plan] shape of one of quadrilateral, round, oval, and triangular.
13. (Amended) A semiconductor device component, comprising:
a substrate having an active surface with contact pads exposed thereto, said contact pads being configured to be connected with conductors on a first surface of another semiconductor device; and
at least one stabilizer protruding from said active surface and positioned between a periphery of said active surface and said contact pads, said at least one stabilizer having a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises dielectric material.
19. (Amended) The semiconductor device component of claim 13, wherein said at least one stabilizer has a cross-sectional [plan] shape of one of quadrilateral, round, oval, and triangular.

25. (Twice amended) A semiconductor device component, comprising:
a substrate having an active surface with contact pads exposed thereto, said contact pads being configured to be connected with conductors on a first surface of another semiconductor device; and
at least one nonconductive stabilizer protruding from said active surface and positioned between a periphery of said active surface and said contact pads, said at least one stabilizer configured to allow an insulative underfill material to flow into a space created when said substrate is connected with said another semiconductor device.

31. (Amended) A semiconductor device component, comprising:
a substrate having an active surface with contact pads exposed thereto, said contact pads being configured to be connected with conductors on a first surface of another semiconductor device, each contact pad of the semiconductor device component being arranged substantially in-line with a plurality of other contact pads and positioned proximate to a center line of said substrate; and
at least one stabilizer protruding from said active surface and positioned between a periphery of said active surface and said contact pads, said at least one stabilizer fabricated directly on said active surface of said substrate.

32. (Amended) A semiconductor device component, comprising:
a substrate having an active surface with contact pads exposed thereto, said contact pads being configured to be connected with conductors on a first surface of another semiconductor device, each contact pad of the semiconductor device component being arranged substantially in-line with a plurality of other contact pads and positioned proximate to a center line of said substrate; and
at least one stabilizer protruding from said active surface and positioned between a periphery of said active surface and said contact pads, said at least one stabilizer preformed separately from said substrate and subsequently attached to said active surface of said substrate.